What is claimed is:

1. A substrate support comprising:

(a) a ceramic block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a ceramic coating covering the substrate pocket and peripheral ledge of the ceramic block, the ceramic coating comprising an amorphous Si-H-N-O compound;

(c) a resistance heater in the ceramic block; and

(d) heater leads extending out of the ceramic block to conduct electrical power to the resistance heater.

2. A support according to claim 1 wherein the amorphous Si-H-N-O compound comprises a silicon content of about 30 wt% to about 50 wt% and a nitrogen content of about 20 wt% to about 40 wt%.

3. A support according to claim 3 wherein the amorphous Si-H-N-O compound comprises a hydrogen content of about 2 wt% to about 30 wt% and an oxygen content of about 1 wt% to about 5 wt%.

4. A support according to claim 1 wherein the ceramic coating comprises a thickness of about 0.1 micron to about 15 microns.

5. A support according to claim 1 wherein the ceramic block is composed of aluminum nitride.

6. A support according to claim 1 comprising an electrode in the ceramic block and an electrode lead extending out of the ceramic block.

7. A support according to claim 1 wherein the resistance heater comprises an electrical conductor having an electrical resistance of about 2.5 ohms to about 5 ohms.

8. A support according the claim 1 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

9. A support according to claim 8 comprising a post extending downwardly from the center of the ceramic block, and wherein the heater leads and the electrode lead extend at least partially through the post.

10. A substrate processing apparatus comprising the substrate support of claim 1, the apparatus comprising:

(1) a process chamber comprising enclosing walls, the substrate support of claim 1, a gas distributor, a gas exhaust, and a gas energizer;

(2) a heater power supply to provide a power at a power level of at least about 1000 watts, to the resistance heater; and

(3) a controller comprising program code to provide instructions to the heater power supply to supply the power having the power level to the resistance heater,

whereby the controller controls the power delivered to the resistance heater by the heater power supply.

11. A substrate support comprising:

(a) a ceramic block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a silicon nitride compound coating covering the substrate pocket and peripheral ledge of the block;

(c) a resistance heater in the block; and

(d) heater leads extending out of the block to conduct electrical power to the resistance heater.

12. A support according to claim 11 wherein the silicon nitride compound coating is amorphous.

13. A support according to claim 11 wherein the silicon nitride compound coating comprises a silicon content of from about 30 wt% to about 50 wt% and a nitrogen content of from about 20 wt% to about 40 wt%.

14. A support according to claim 11 wherein the silicon nitride compound coating comprises hydrogen and oxygen.

15. A support according to claim 14 wherein the silicon nitride compound coating comprises a hydrogen content of about 2 wt% to about 30 wt% and an oxygen content of about 1 wt% to about 5 wt%.

16. A support according to claim 11 comprising an electrode in the ceramic block and an electrode lead extending out of the ceramic block.

17. A support according the claim 11 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

18. A substrate support comprising:

(a) a block comprising a first ceramic, the block having a substrate receiving pocket that is sized to receive a substrate therein, a peripheral ledge extending about the substrate receiving pocket, and side surfaces;

(b) a coating comprising a second ceramic, the coating covering the substrate pocket and peripheral ledge of the block;

(c) a resistance heater in the block;

(d) a gas energizer electrode in the block; and

(e) heater and electrode leads extending out of the block to conduct power to the resistance heater and gas energizer electrode, respectively.

19. A support according to claim 18 wherein the second ceramic comprises a silicon nitride compound.

20. A support according to claim 19 wherein the silicon nitride compound is amorphous.

21. A support according to claim 19 wherein the silicon nitride compound comprises a silicon content of from about 30 wt% to about 50 wt% and a nitrogen content of from about 20 wt% to about 40 wt%.

22. A support according to claim 18 wherein the second ceramic comprises an amorphous Si-H-N-O compound.

23. A support according to claim 22 wherein the amorphous Si-H-N-O compound comprises a hydrogen content of about 2 wt% to about 30 wt% and an oxygen content of about 1 wt% to about 5 wt%.

24. A support according the claim 18 wherein the resistance heater comprises a plurality of independently controllable resistive heating elements.

25. A method of refurbishing a substrate support comprising a ceramic block having a residual ceramic coating, the method comprising:

(a) exposing the substrate support to a fluorine-containing cleaning medium to remove the residual ceramic coating from the ceramic block to form a clean ceramic block;

(b) placing the clean ceramic block in a deposition chamber; and

(c) depositing a new ceramic coating on at least a portion of the clean ceramic block.

26. A method according to claim 22 wherein the fluorine-containing cleaning medium comprises an acidic solution.

27. A method according to claim 22 wherein the fluorine-containing cleaning medium comprises an energized fluorine-containing gas.

28. A method according to claim 22 wherein (c) comprises heating the clean ceramic block and exposing the heated ceramic block to a process gas comprising silicon and nitrogen species.

29. A method according to claim 22 comprising:
(d) annealing the new ceramic coating.

30. A method according to claim 29 comprising alternating (c) and (d) a plurality of times.

31. A method according to claim 28 wherein the process gas comprises silane, ammonia, and nitrogen.